REMARKS

Claims 1, 2, 4-6, 22, 23, and 25

Claims 1, 2, 4-6, 22, 23, and 25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Shimoda (U.S. Patent 6,122,120).

Independent claim 1 is directed to a method of identifying an equalization target for a channel. The method includes measuring a goodness metric for a first candidate target and measuring a goodness metric for a second candidate target. The measures of the goodness metric are compared to each other and the target with the better measure of the goodness metric is selected as the equalization target for the channel.

Shimoda does not show or suggest the invention of claim 1. In particular, Shimoda does not show selecting an equalization target for a channel from two candidate targets.

In the Office Action, it was asserted that Shimoda taught a step of selecting a target in Column 1, line 54 to Column 2, line 7; Column 2, lines 21-32; and Column 11, line 38, to Column 12, line 11. Applicant respectfully disputes this assertion.

In the cited sections, Shimoda makes no mention of selecting an equalization target from two candidate targets. In particular, Shimoda's calculation of a branch metric does not form any part of selecting an equalization target. It is simply the technique used to select which data bit is most likely given a partial response signal. Shimoda does not change the equalization target based on the branch metric.

At no time is Shimoda selecting between two candidate equalization targets based on a goodness metric measured for each of the candidates. In fact, Shimoda makes no mention of evaluating the performance of any candidate equalization target, but instead simply assumes that an MEEPR4 target is the best

target for any drive. This is substantially different from the invention of claim 1, where two different equalization targets are being evaluated.

Since Shimoda does not select between two different equalization targets, it does not show the invention of claim 1 or claims 2 and 4-6, which depend therefrom.

Independent claim 22 is directed to a method for selecting an equalization target. Under the method, a spectral null constraint is selected. An equalization target is then selected by at least initially using the spectral null constraint.

Shimoda does not show or suggest the invention of independent claim 22, because it does not select a spectral null constraint and does not use a spectral null constraint to select an equalization target.

In the Office Action, Column 12, lines 25-32 were cited as showing that Shimoda selects a spectral null constraint. Although the cited section refers to a spectrum null, it does not indicate that a spectral null is selected. Instead, this spectral null is an artifact of the selection of an equalization target. Thus, instead of using a spectral null constraint to select an equalization target, Shimoda selects an equalization target and then must deal with the spectral null that comes with that target. This is substantially different from the invention of claim 22, where a spectral null constraint is selected.

Further, Shimoda does not use a spectral null constraint to select an equalization target. In fact, Shimoda does not discuss why the equalization target of MEEPR4 has been selected. As such, it cannot show using a spectral null constraint to select an equalization target as found in claim 22.

Because Shimoda does not show selecting a spectral null constraint or selecting an equalization target based on a spectral null constraint, it does not show or suggest the

inventions of claim 22, or of claims 23 and 25, which depend therefrom.

Claim 3

Claim 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shimoda in view of McEwen et al. (U.S. Patent 6,732,328, hereinafter McEwen).

Claim 3 depends from claim 1. Under claim 3, measuring a goodness metric for a candidate target comprises performing post-processing on equalized data to form post-processing data and then measuring the number of parity errors in the post-processing data. Thus, under claim 3, the number of parity errors in the post-processing data is measured to provide a goodness metric that is used to select an equalization target for a channel. Neither Shimoda nor McEwen show or suggest selecting an equalization target for a channel based on a number of parity errors.

As noted above, Shimoda does not show a step of selecting an equalization target based on a goodness metric. As such, it does not show or suggest selecting an equalization target based on parity errors. Similarly, McEwen does not show or suggest selecting an equalization target based on a number of parity errors in post-processing data. Instead, McEwen shows a decoder system that can correct parity errors. It makes no mention of selecting an equalization target based on the number of parity errors.

Since neither Shimoda nor McEwen show or suggest measuring the number of parity errors to determine a goodness metric that is used to select an equalization target, their combination does not show or suggest the invention of claim 3.

Claims 7-10, 15-17, and 24

Claims 7-10, 15-17 and 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Shimoda in view of Sawaguchi et al. (U.S. Patent 5,539,588, hereinafter Sawaguchi).

Claims 7-10 depend from claim 1 and include the limitation to selecting an equalization target from two candidate targets based on a goodness metric. Neither Shimoda nor Sawaguchi show or suggest selecting an equalization target from two candidate targets based on a goodness metric.

In addition, under claim 7, an equalization target was initially selected from two candidates that were constrained to have a spectral null. This equalization target is then modified to form a new target that does not have a spectral null. Neither Shimoda nor Sawaguchi show modification of an equalization target to form a new target that does not have a spectral null. Thus, claim 7 and claims 8-10 which depend therefrom are not shown in the combination of Shimoda and Sawaguchi.

Independent claim 15 provides a method for forming an equalization target for a channel. Under the method, a plurality of candidate equalization targets are searched that each satisfy a spectral null constraint to locate an initial equalization target that provides a best goodness measure. The initial equalization target is then adjusted so that it no longer satisfies the spectral null constraint.

Neither Shimoda nor Sawaguchi shows or suggests searching through a plurality of candidate equalization targets that all satisfy a spectral null constraint to locate an initial equalization target.

In the Office Action, it was asserted that Shimoda shows this search in Column 11, line 38 through Column 12, line 32. Applicant respectfully disputes this assertion.

The cited section makes no mention of searching through a plurality of candidate equalization targets that satisfy a spectral null constraint. Note that changing the target tap

coefficients is not the same as changing the target itself. Changing the target tap coefficients simply changes the FIR filter so that the filter will produce the desired target equalization. It is not the same as selecting between possible candidate equalization targets.

Since neither Shimoda nor Sawaguchi show a step of selecting an equalization target from a plurality of candidate equalization targets that all satisfy a spectral null constraint, the combination of these two references does not show or suggest the invention of claim 15 or claims 16 and 17, which depend therefrom.

Dependent claim 24 depends from claim 23 and therefore includes a limitation to selecting an equalization target from a plurality of equalization targets that satisfy the spectral null constraint. As noted above for claim 15, neither Shimoda nor Sawaguchi show or suggest selecting an equalization target from a plurality of equalization targets that satisfy a spectral null constraint. As such, claim 24 is patentable over Shimoda and Sawaguchi.

Claims 13 and 14

Claim 13 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shimoda in view of Leung et al. (U.S. Patent 6,546,518, hereinafter Leung). Claim 14 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Leung.

In claims 13 and 14, a channel is provided with an equalization target of the form $(1-D)(4+6D+2D^2+D^3)$. Neither Shimoda nor Leung show or suggest such an equalization target for a channel.

In the Office Action, it was asserted that since Leung shows an equalization target of the order $(1-D)(1+D)^N$ in which N can be 1, 2 or 3, it shows the equalization target of claims 13 and 14 because it would have been obvious to a person of ordinary

skill in the art to modify the coefficients for the equalized polynomial in order to minimize noise in the signal being read.

Applicant first notes that neither Leung nor Shimoda show the actual equalization target of claims 13 and 14. In addition, since there is an infinite number of equalization targets that can be formed for a channel, there must be at least some suggestion for picking the particular coefficients of claims 13 and 14 in order to render these particular equalization targets obvious. In fact, Shimoda and Leung do not show or suggest any technique for picking the coefficients of an equalization target and do not show or suggest that the particular coefficients of claims 13 and 14 should be used as a equalization targets. There is nothing obvious about picking these particular coefficients for the equalization targets from the infinite possible values that could be applied to form the equalization targets. As such, claims 13 and 14 are not obvious from the combination of Shimoda and Leung.

Claim 18

Claim 18 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shimoda and Sawaguchi as applied to claim 18 and further in view of McEwen.

Under claim 18, an initial equalization target is selected from a plurality of candidate equalization targets by locating the equalization target that generates the fewest parity errors in data produced by the channel. None of Shimoda, Sawaguchi or McEwen show or suggest selecting an equalization target based upon which equalization target provides the fewest parity errors.

In the Office Action, it was suggested that McEwen teaches locating an initial equalization target that generates the fewest parity errors in the data. However, McEwen makes no suggestion of selecting an equalization target. More

importantly, McEwen does not suggest selecting an equalization target based on which equalization target provides the fewest parity errors. Instead, McEwen simply suggests that a second level of decoding be provided that can correct parity errors that pass through a Viterbi detector.

Since there is no suggestion in any of the references for selecting an initial equalization target from a plurality equalization targets based on which equalization target generates the fewest parity errors in the data, claim 18 is patentable over the combination of Shimoda, Sawaguchi and McEwen.

Claims 11, 12, and 19-21

Applicant acknowledges that the Examiner would have allowed claims 11, 12, and 19-21 if rewritten in independent form.

Conclusion

In light of the above remarks, claims 1-25 are in form for allowance. Reconsideration and allowance of the claims is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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